



Using Hollywood for Science

- The Satellite Test of the Equivalence Principle (STEP) was a proposed NASA Small Explorer mission which would test the principle that all masses, regardless of size or composition, will experience the same acceleration in a given gravitational field.
- This principle is a fundamental assumption in Einstein's General Theory of Relativity.



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- The experiment utilizes a pair of test masses in orbit about the Earth.
- The two test masses have different sizes and compositions and their centers of mass coincide.
- The masses are kept in a “drag-free” environment (i.e., they are shielded from outside influences other than gravity).
- A violation of the Equivalence Principle is expressed as a deviation between the orbits of the two test masses.



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- This movie contains a simulation of the relative motion of two test masses in the experiment in orbit about the Earth when the Equivalence Principle is violated, followed by an animation of the assembly of the various parts of the experiment.
- The modeling, animation, and rendering of the movie were performed using Alias|Wavefront's Maya Complete 4.0 software package.
- The rendering took approximately three hours on eight processors of Alhena, the JPL SGI Origin 2000 supercomputer.



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- In the assembly animation, the inner test mass (gold cylindrical object in the center) slides on a superconducting bearing (green rod); the outer test mass (red cylindrical object) slides on a second superconducting bearing (light blue cylinder).
- The positions of the test masses are sensed by Superconducting Quantum Interference Devices (SQUIDS) on each end (light green for the inner test mass SQUIDs and magenta for the outer test mass SQUIDs).



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Acknowledgements:

The STEP Project was originated at Stanford University by C.W. Francis Everitt, Paul Worden, and Rodney Torii.

The JPL Project Manager was Guy K. Man.



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